

1401 Quiz for Chapters 10 – 14

Name:

Section:

1. When you throw a curve ball, the ball is given a fairly rapid spin. If a 0.20-kg baseball with a radius of 3.7 cm is thrown with a linear speed of 40 m/s and an angular speed of 50 rad/s, how much of its kinetic energy is translational and how much is rotational? Assume the ball is a uniform, solid sphere.

2. When a ceiling fan rotating with an angular speed of 5.60 rad/s is turned off, a frictional torque of 0.15 N·m slows it to a stop in 25.0 s. What is the moment of inertia of the fan?

3. A child exerts a tangential 40.0-N force on the rim of a merry-go-round with a radius of 2.40 m. Please calculate its torque. If the merry-go-round's moment of inertia is 800 kg m^2 , what is its angular acceleration? What is its mass?

4. In one hand you hold a 0.15-kg apple, in the other hand a 0.20-kg orange. They are separated by 0.80 m. What is the magnitude of the force of gravity that **(a)** the orange exerts on the apple and **(b)** the apple exerts on the orange?

5. (a) Calculate the potential energy of a 10.0-kg mass on the surface of the Earth and at an altitude of 700 km respectively; (b) calculate the speed needed to move this mass from surface of the Earth to the altitude of 700 km.

6. A 0.50-kg mass attached to a spring undergoes simple harmonic motion with a period of 1.50 s. What is the force constant of the spring?

7. After landing on an unfamiliar planet, a space explorer constructs a simple pendulum of length 60.0 cm. The explorer finds that the pendulum completes 60.0 full swing cycles in a time of 120 s. What is the value of the acceleration of gravity on this planet?

8. The intensity level in a truck is 120 dB. What is the intensity of this sound?

9. A train is traveling at 45.0 m/s relative to the ground in still air. The frequency of the note emitted by the train whistle is 250 Hz. (a) What frequency f_1 is heard by you if you are standing on the ground? (b) if the train is not moving, but you are driving a car toward it at 45.0 m/s relative to the ground, what frequency f_2 is heard by you?